

GEOGRAPHY EDUCATION ASSOCIATION TURKEY

THE 2020 INTERNATIONAL EARTH SCIENCE OLYMPIAD TURKEY NATIONAL EXAMINATION

NAME – SURNAME: _____

15 February 2020

INSTRUCTIONS:

The exam consists of 60 multi-choice questions.

Each correct answer is 1 point. 1/3 point will be subtracted for each wrong answers. Blank answers are 0 point

Each of the questions or incomplete statements is followed by four suggested answers or completions. Select the one that is best in each case and then fill in the corresponding oval on the answer sheet.

The response time of the exam is 120 minutes.

You may not leave the exam room in the first 30 minutes or in the last 15 minutes.



GEOGRAPHY EDUCATION ASSOCIATION - TURKEY THE 2020 INTERNATIONAL EARTH SCIENCE OLYMPIAD TURKEY NATIONAL EXAMINATION

1. A volcano which is composed of lava flows and pyroclastic material and which is steepsided and very tall is known as:

- (A) Syncline
- (B) Composite cone
- (C) Anticline
- (D) none of these

2. Iceland has a great deal of volcanic activity. The reason for this is:

(A) it was formed above a mid-ocean rift.

(B) it is part of the "Ring of Fire".

(C) two tectonic plates are rubbing against each other under Iceland.

(D) the American plate is diving under the European plate in this region.

3. Which of the following pairs contains one igneous and one sedimentary rock?

(A) shale and marble

- (B) sandstone and quartzite
- (C) granite and limestone
- (D) obsidian and gneiss

4. The black sand of the Hawaiian Islands is composed of which of the following?

- (A) dark limestone
- (B) quartz
- (C) gypsum
- (D) basalt

5. Which of the following is the name of the partly melted rock layer on which the plates move?

- (A) lithosphere
- (B) asthenosphere
- (C) hydrosphere
- (D) outer core

6. The disappearance of the dinosaurs also marks the end of which geological era?

- (A) Precambrian
- (B) Cambrian
- (C) Mesozoic
- (D) Cenozoic

7. High quality crop soil requires humus as a major component. Which of the following best describes the composition of humus (A) fine sand particles

- (B) decaying organic matter
- (C) mineral like clay matter
- (D) chemical fertilizers

8. The earth's average density is:

- (A) 2.82 grams per cubic centimeter
- (B) 4.75 grams per cubic centimeter
- (C) 5.52 grams per cubic centimeter
- (D) 10.5 grams per cubic centimeter

9. Caves are frequently associated with a certain kind of topography that includes sinkholes, disappearing streams and many limestone outcrops. With which of the following topographies are such features related?

- (A) arid topography
- (B) valley and ridge topography
- (C) Karst topography
- (D) none of these

10. In geological studies, the Mohorovicic Discontinuity, commonly called the Moho, is the boundary between the

- (A) the mantle and the crust
- (B) asthenosphere and the mantle
- (C) mantle and the outer core
- (D) outer core and the inner core

11. Which evidence supports the theory of ocean floor spreading?

(A) The rocks of the ocean floor and the continents have similar origins.

(B) In the ocean floor, rocks, near the midocean ridge are cooler than rocks near the continents.

(C) The pattern of magnetic orientation of rocks is similar on both sides of the mid-ocean ridge.

(D) The density of oceanic crust is greater than the density of continental crust.

12. Which of the following structures is most susceptible to damage by acid precipitation?

(A) A monument made of granite

(B) A roof made of slate

(C) A tombstone made of marble

(D) A statue made of gabbro

13. What is the main difference between magma and lava?

(A) Magma always has high viscosity, lava always has low viscosity

(B) Magma is produced deep in the core of the Earth, lava is produced in the lithosphere(C) Magma is the direct result of plate tectonic movement, lava is the result of orogenies

(D) Magma located underground, lava is located on the surface

14. Geologic exploration of area reveals a significant degree of faulting and folding in the mountains. Which of the following plate boundaries combinations most likely met to create the deformations?

(A) Convergent oceanic-continental

(B) Convergent continental-continental

- (C) Divergent continental-continental
- (D) Divergent oceanic-continental

15. When the acid solution is dropped onto a sample, the sample effervesces. Based on that reaction you can infer that

(A) the sample contains iron (Fe)

(B) the sample contains nitrogen (N)

(C) the sample contains calcium carbonate $(CaCO_3)$

(D) the sample contains halite (NaCl)

16. Which of the following energy sources does NOT originally come from the Sun? (A) wind

- (B) Ocean thermal energy conversion
- (C) geothermal
- (D) hydroelectric

17. What is the relative humidity when the absolute humidity is 3 grams per cubic meter and the air has a capacity of 12 grams per cubic meter?

(A) 4%

(B) 9%

(C) 25%

(D) 400%

18. While many different gases are found in the atmosphere, a number do NOT contribute significantly to solar heating of the atmosphere. Which of the following gases do NOT absorb much heat?

(A) carbon dioxide & water vapor

(B) nitrogen & oxygen

(C) water vapor & nitrogen

(D) oxygen & water vapor

19. Global climate change is being attributed to the atmospheric increase in what two gases produced by human activities? (A) oxygen and hydrogen

A) oxygen and nydrogen

(B) ozone and carbon monoxide

(C) nitrous oxide and sulfur dioxide

(D) methane and carbon dioxide

20. Trade winds are persistent easterly winds develop between:

(A) subtropical high pressure and equatorial doldrum

(B) subtropical high pressure and subpolar low pressure

(C) westerlies and polar highs

(D) none of the above

21. The Earth's climate has been warming since the last glacial period which ended about how many years ago?

(A) 1,000 to 2,000 years ago

(B) 10,000 to 20,000 years ago

(C) 100,000 to 200,000 years ago

(D) 1,000,000 to 2,000,000 years ago

22. Certain substances are classified as water pollutants, others as air pollutants and still others as land pollutants. Which of the following pollutes all three parts of our environment?

(A) fluorocarbons

- (B) smog
- (C) acid rain
- (D) ozone

23. The Greenhouse Effect is caused primarily by which of the following processes?

(A) blocking incoming short wave solar energy (B) absorbing incoming short wave solar energy

(C) heating of the Earth's stratosphere

(D) absorbing outgoing long wave radiation from the Earth

24. The degree of aridness of a geographic region is generally defined as the ratio of precipitation to:

(A) condensation

- (B) evaporation
- (C) transpiration
- (D) snowpack depth

25. Which weather conditions are most probable when the moisture content of the air increases, resulting in a lower atmospheric pressure?

- (A) sunny and fair
- (B) cold and windy
- (C) partly cloudy, with skies becoming clear
- (D) cloudy, with a chance of precipitation

26. A square meter of surface of which of these natural areas would most likely absorb the most insolation during a clear day?

- (A) a fast-moving river
- (B) a dark-green forest
- (C) a beach with white sand
- (D) a snow-covered field

27. All of the following gases have been implicated in contributing to the increase in global temperatures via the greenhouse effect EXCEPT

(A) O₂

- (B) CH₄
- (C) CO₂
- (D) CFC's

28. Which of the following will occur if the trend of global temperature increase continues?

(A) Night temperatures will decrease as day temperatures increase

(B) Tropical areas will become cooler than they currently are.

(C) Sea levels will drop due to increased evaporation.

(D) The troposphere will contain more water vapor.

29. The drop in stratospheric ozone levels in the Southern Hemisphere (the "ozone hole") is most evident during which season?

- (A) Antarctic spring (October)
- (B) Antarctic autumn (April)
- (C) Antarctic summer only (January)
- (D) Antarctic winter only (July)

30. In models of global warming, the most important factor contributing to an increase in sea level is

- (A) thermal expansion of the oceans
- (B) increased precipitation
- (C) decreased evaporation
- (D) growth of the polar ice caps

31. Which surface soil conditions allow the most infiltrations of rainwater?

- (A) steep slope and permeable soil
- (B) steep slope and impermeable soil
- (C) gentle slope and permeable soil
- (D) gentle slope and impermeable soil

32. The upward movement of water through tiny spaces in soil or rock is called

- (A) water retention
- (B) capillary action
- (C) porosity
- (D) permeability

33. Soil composed of which kind of particles would have the longest infiltration time? (Assume that all particles allow some water to pass through)

- (A) pebbles
- (B) sand
- (C) silt
- (D) clay

34. The diagram below is a map view of a stram flowing through an area of loose sediments. Arrows show the location of the strongest current.



Which stream profile best represent the cross section A to A'?



35. Most of the Gulf Stream Ocean Current is

- (A) warm water that flows southwestward
- (B) warm water that flows northeastward
- (C) cool water that flows southwestward
- (D) cool water that flows northeastward

36. Reasons that human population historically have settled in floodplains include which of the following?

I. The soil in floodplains is usually fertile. II. The terrain in floodplains tends to be flat. III. Floodplains are close to rivers for transportation.

(A) I and II only(B) I and III only(C) II and III only(D) I, II and III

37. The graph below shows the tidal changes in ocean water level, in meters, recorded at a coastal location on a certain day.



Approximately how many hours apart were the two high tides?

- (A) 6h
- (B) 12h
- (C) 18h
- (D) 24h

38. The dissolved salts in Earth's oceans are principally derived from

(A) marine biological activity

(B) atmospheric deposition

(C) the weathering of continental rocks

(D) the eruptions of undersea hot-spot volcanoes.

39. The ultimate source of energy for terrestial ecosystems is

- (A) nutrients in soil
- (B) primary consumers
- (C) producers
- (D) the Sun

40. The major reservoirs of nitrogen and sulfur in the biosphere are correctly identified by which of the following?

<u>Nitrogen</u>	<u>Sulfur</u>
(A) Rocks	Rocks
(B) Rocks	Atmosphere
(C) Atmosphere	Rocks
(D) Atmosphere	Atmosphere

41. The major biological source of dissolved oxygen in the ocean comes from (A) decomposition of organic sediments on

the ocean floor

- (B) oxidation of sulfur by bacteria in ocean vent communities
- (C) photosynthesis by phytoplankton
- (D) respiration by zooplankton

42. Of the following, which is the best example of a point source of water pollution?

(A) Factory effluent

(B) Storm water

(C) Acid precipitation

(D) Agricultural runoff

43. Traveling southward from the Arctic regions of Canada to the tropics of Panama, one passes through several biomes—tundra, coniferous forest, temperate deciduous forest, and tropical rain forest. This pattern of change in vegetation is primarily the result of

(A) primary and secondary succession(B) an increase in the total annual hours of sunlight

(C) an increase in mean annual temperature and a decrease in mean annual precipitation(D) an increase in both mean annual temperature and mean annual precipitation

44. The surface of the sea is not level because of a variety of factors. Which of the following factors does NOT contribute to an irregular surface?

(A) Wind

- (B) Currents
- (C) Salinity
- (D) Tides

45. The hydrologic cycle constantly recycles the available water resources on Earth. Which of the following factors is the key driving force behind the continued functioning of the hydrologic cycle?

(A) The amount of insolation received in an region

(B) The volume of water in a region

(C) The atmospheric pressure differences in a region

(D) The density of water in a region

46. In the nebular hypothesis, each planet is formed from which of the following? (A) a comet

- (A) a connet
- (B) a number of moons
- (C) a passing star (\mathbf{D})
- (D) a ring of gas

47. On which one of the following is the largest known volcanic cone in the solar system located?

(A) Earth (B) Io

(C) Mars

(D) the Moon

48. Which one of these is NOT true?

(A) All planets revolve in the same direction.

(B) All planets rotate in the same direction.

(C) The orbits of the planets are all ellipses.

(D The orbits of the planets are nearly in the same plane.





Compared to planet A, planet B has a,

(A) weaker gravitational attraction to the star, and a shorter period of revolution.
(B) weaker gravitational attraction to the star, and a longer period of revolution.
(C) stronger gravitational attraction to the star, and a shorter period of revolution.
(D) stronger gravitational attraction to the star, and a longer period of revolution.

50. The phases of the Moon are caused by the

- (A) Earth's revolution around the Sun
- (B) Moon's revolution around the Earth
- (C) Moon's varying distance from the Earth
- (D) Sun's varying distance from the Moon

51. The bar graph below shows one planetary characteristic, identified as *X*, plotted for the planets of our solar system.



Which characteristic of the planets in our solar system is represent by *X*?

- (A) mass
- (B) density
- (C) eccentricity of orbit
- (D) period of rotation

52. Earth's orbital velocity is slowest on July 4 because

(A) the Moon is closest to Earth

(B) Earth's distance from the Sun is greatest (C) Earth, The Moon, and the Sun are located along a straight line in space

(D) the highest maximum temperatures ocur in the Northern Hemisphere.

53. To an observer on Earth, the Sun appears brighter than the star *Rigel* because the Sun is

(A) hotter than Rigel

(B) more luminous than *Rigel*

(C) closer than *Rigel*

(D) larger than *Rigel*

54. During a total solar eclipse one might view

- (A) sun spots
- (B) the sun's corona

(C) the sun's solar winds

(D) nothing of the sun, since it is totally blocked by the moon

55. Why are impact structures more obvious on the moon than on Earth?

(A) The Moon's gravity is stronger than Earth's gravity.

(B) The Moon has little or no atmosphere.

(C) The rocks on the Moon are weaker than those on Earth.

(D) The Moon rotates at a slower rate than Earth does.

56. Which event occured more than 10 billion years ago?

- (A) Big Bang
- (B) origin of life on Earth
- (C) Pangea begins to break up
- (D) origin of Earth and its Moon

57. A red shift in the light from very distant galaxies suggested that the universe is

(A) fixed and stationary

(B) moving randomly

- (C) contracting
- (D) expanding

58. Which of the following has provided evidence that the Sun's atmosphere contains sodium atoms?

(A) Absorption lines in the solar spectrum are consistent with the presence of sodium.

(B) Stars with the same spectral class as the Sun are made mostly of sodium.

(C) Solar samples returned to Earth by the Voyager spacecraft contained sodium.

(D) The sun gives off energy produced by the nuclear fusion of sodium in its core.

59. The clouds that surround Venus are so thick that the planet actually absorbs less sunlight than the Earth. Nevertheless, Venus has a surface temperature of more than 400°C. Which of these best explains this high surface temperature?

(A) The bright surfaces of the clouds reflect sunlight back on the planet.

(B) The strong winds in the atmosphere produce friction.

(C) The thick clouds in the atmosphere prevent heat from escaping.

(D) The sulfuric acid in the clouds releases heat energy.

60. It has been determined that the oldest rocks retrieved from the Moon by Apollo astronauts were formed 4.44 billion years ago, while the oldest rocks found on Earth are less than 4 billion years old. This difference is most likely because

(A) Earth formed well after the Moon was formed.

(B) Earth cooled more slowly than the Moon.

(C) Earth's oldest rocks have been recycled by plate tectonics and erosion.

(D) Earth and the Moon were both captured by the Sun's gravity at different times.





GEOGRAPHY EDUCATION ASSOCIATION TURKEY www.tceder.org